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Magnetic Tape Transport Controlled by Rotating Transducer Heads

A magnetic tape transport has been designed to include a common drive for both the tape drive capstan and the rotating record/reproduce heads. Speed of the drive may be varied within a preselected range, but, once selected, remains constant so that head and capstan are driven in synchronization and at constant speed for the duration of the operating mode selected. To ensure correct tracking by the heads, tape speed is varied by controlled tension on the tape between capstan and supply reel by a braking device on the supply reel. For time-base expansion playback at low speed, a flywheel on the motor, capstan, and head drive shaft provides more constant speed. Switching of the heads is accomplished by circuitry mounted on the head drum and the low-speed reproduce signal is amplified by additional circuitry mounted on the head drum in order to improve the signal-to-noise ratio at the lower speed.

The tape is guided from the supply reel by conventional means into a transversely curved concentric relation to a head drum so the heads successively sweep the width of the tape as the head drum rotates. Synchronization between head drum and tape capstan is achieved through a worm drive formed by threads on one shaft from the drive motor engaging a gear on the capstan and by a second shaft, from the opposite end of the drive motor, on which the head drum is mounted. To assure that the heads correctly track on the tape during the playback mode, regardless of dimensional changes that may have occurred subsequent to recording, a tachometer operates in conjunction with a light source, photocell, and electronic

circuitry to impress a control track on the tape by means of a transducer on the head drum during the record mode. A second transducer "reads" this control track during playback and varies the torque of a braking motor coupled to the supply reel to vary tension on the tape. This physically stretches or relaxes the tape to alter the mass rate of flow of the tape past the capstan even though the capstan speed remains constant.

Notes:

1. This system eliminates the need for the usual capstan motor and associated servo control circuitry. The recorder also combines 1500 ips record/reproduce and 30 ips reproduce in a single head.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B68-10079

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457 (f)], to the Ampex Corporation, 934 Charter Street, Redwood City, California.

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Category 01